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Estelle Lcsellier

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS

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BRIARCLIFF MANOR, NY 10510

EXAMINER

THOMAS, MIA M

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

12/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/522,467

Applicant(s)

LESELLIER ET AL.

Examiner

Mia M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>see attached</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the applicant's remarks received on 26 January 2005. Claims 1-9 remain pending. The foregoing amendments to the claims were made solely to avoid filing the claims in multiple dependent form so as to avoid the additional filing fee. The preliminary amendment for instant application 10/522,467 has been entered for the record.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections - 37 CFR 1.75(a)

3. The following is a quotation of 37 CFR 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

Claim 3 is objected to under 37 CFR 1.75(a), as failing to conform to particularly point out and distinctly claim the subject matter which application regards as his invention or discovery.

Regarding Claim 3, the term "substantially higher" is considered narrow language and is a relative term, which renders the claim indefinite in accordance with the interpretation of the claimed subject matter. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art may not be reasonably apprised of the scope of the invention. How much higher is "substantially higher?" Without a firm grasp of what constitutes "substantially higher", one cannot determine how to determine the blocking density of the neighboring rows", e.g. as

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recited in claim 3. Those of ordinary skill in the art may well reasonably disagree on the degree of "sustainability". Correction or clarification on the record is required.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show appropriate contrast and distinct details as described in the specification. Specifically at Figure 3a and Figure 3b, P as shown diagrammatically on page 2 of 3 in the drawings, above SG (t), does not clearly show the numbers associated with SG (t) and RG (t). It appears that there are some numerical digits i.e. numbers 2 and 0 but it is not clear where they should be placed or associated as suggested in Figure 3a. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

6. Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 9 defines a computer program product embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that

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are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A "signal" (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-3, 6, 8, 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Martins et al. (US 6,438,275 B1).

Regarding Claim 1: Martins discloses a method of processing a sequence of digital images ("An embodiment of the present invention comprises a method and apparatus for performing motion compensated, pixel-based interpolation of frames in a digital video stream." at column 2, line 2, line 53), intended to detect a grid corresponding to blocking artifacts ("Embodiments of the present invention provide improvements over the prior art for delivering better quality interpolated frames, a wider operating range in terms of frame rate and data rates, improved multiple frame interpolation quality, and better handling of scene changes and fast motion sequences." at column 2, line 56), said method comprising the steps of: detecting (100) a spatial grid (SG) within a portion of the image ("In one embodiment, pixel motion may be detected by a change in one or more of the red, green and blue pixel color values from one frame to the next frame." at column 5, line 36), determining (200) a current reference grid (RG(t)) (Refer to Figure 2, numeral 22) from a current spatial grid (SG(t)) (Refer to figure 2, numeral 20) and a preceding reference grid (RG(t-1)) (Refer Figure 2, numeral 24).

Regarding Claim 8: Martins discloses a device for processing a sequence of digital images, intended to detect a grid corresponding to blocking artifacts ("FIG. 1 is a diagram of a system 10

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for multimedia communication between a "sender 12" and a receiver 14 over a communications path 16 according to one embodiment of the present invention. Sender 12 may be any device for communicating multimedia data signals. Receiver 14 may be any device for receiving, processing and displaying audio and video streams..." at column 4, line 24) said device comprising: means for detecting a spatial grid (SG) within a portion of the image ("In one embodiment, pixel motion may be detected by a change in one or more of the red, green and blue pixel color values from one frame to the next frame." at column 5, line 36), means for determining a current reference grid (RG (t)) (Refer to Figure 2, numeral 22) from a current spatial grid (SG (t)) (Refer to Figure 2, numeral 20) and a preceding reference grid (RG (t-1)) (Refer to Figure 2, numeral 24).

Regarding Claim 2: Martins discloses wherein a grid (SG, RG) comprises sets of at least one block artifact ("By comparing pixel values in the frames, each pixel may be classified as either stationary, moving, covered, or uncovered. Initially, a threshold comparison may be made to determine if a pixel has changed or not changed. If the pixel has the same values in the previous to the previous frame, the previous frame, and the current frame, then no change was detected and the pixel may be classified as stationary." at column 5, line 39) and wherein the reference grid (RG) (Refer to the arrow connecting Figure 2, numeral 22) comprises an indicator (ind) associated with a set of at least one block artifact (with Figure 2, numeral 36), an indicator of the current reference grid (RG(t)) being updated from the corresponding indicator of the preceding reference grid (RG(t-1)) (Refer to Figure 2, numeral 28) and from the presence or absence of the set of at least one block artifact associated with said indicator in the current spatial grid (SG(t)) ("Pixel classifications may be used by rendering component 28 during generation of interpolated frames 30. Rendering component 28 uses the output of the pixel

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classification component 26 to identify triangles of meshes in a frame that may be trivially rendered by simple copying from a source frame (e.g., a previous frame) to a new interpolated frame. This provides processing savings and quality enhancement for static background regions within a frame. Trivially renderable triangles are those that have a large majority of stationary pixels, and thus they can be rendered as a direct copy of the previous frame into the interpolated frame." at column 5, line 57).

Regarding Claim 3: Martins discloses wherein the set of blocking artifacts is constituted by a row of the portion of the image having a blocking artifact density which is substantially higher than that of the neighboring rows (Refer to Figure 3, numerals 46, 48, 50 and 52; " At block 48, nodes may be inserted into the frame image boundary to deal with boundary conditions. Next, at block 50 the pre-processed edge map may be recursively traced to identify both nodes and edge segments. Every time a node is identified, a protection zone around the node (in one embodiment, a 7 x7 pixel rectangle may be used) is marked as already traced. The protection zone demarcation may be used to avoid the generation of nodes that are too close to each other, a problem that may exist for both triangulation and rendering. Pseudo code for recursive node identification via edge tracing in one embodiment is shown in Table I." at column 7, line 63).

Regarding Claim 6: Martins discloses comprising a step (300) of correcting the blocking artifacts which are present in a set of blocking artifacts of the current reference grid (RG (t)) in accordance with a value of the indicator (ind) associated with said set ("Blocks 40-46 may be used to "clean up" the edge maps such that spurious and texture edges are not considered in the node selection process. FIG. 4 is an example of a previous frame before and after edge

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detection, edge thinning, edge linking, and removal of short edges according to an embodiment of the present invention. The image on the left of FIG. 4 is a sample previous frame prior to edge processing. The image on the right of FIG. 4 illustrates the results of processing of blocks 40-46." at column 7, line 54).

Regarding Claim 9: Martins discloses a computer program product comprising a set of instructions which, when loaded into a circuit, causes said circuit to perform the method of processing digital images as claimed in claim 1 ("However, embodiments of the invention may be implemented as computer programs executing on programmable systems comprising at least one processor, a data storage system (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. Program code may be applied to input data to perform the functions described herein and generate output information." at column 11, line 1; For further see lines 7-11).

9. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Kutka et al. (US 7,173,968 B1).

Regarding Claim 1: Kutka discloses a method of processing a sequence of digital images (Refer to Figures 1A to 1F; "The camera K supplies a sequence of digitized images B to the first computer R1." at column 4, line 13), intended to detect a grid corresponding to blocking artifacts ("Arrows P of FIG. 1B to FIG. 1C symbolically show the imaging of the individual image blocks BB of the block grid with interspaces Z to the reduced image grid BR." at column 4, line 49), said method comprising the steps of: detecting (100) a spatial grid (SG) within a portion of the image (Refer to Figure 1C, "BR"-reduced image grid), determining (200) a current reference

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grid (RG(t)) (Refer to Figure 1F) from a current spatial grid (SG(t)) and a preceding reference grid (RG(t-1)) (Refer to Figure 1E).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 4, 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martins et al. (US 6,438,275 B1) in combination with Nio et al. (US 6,738,528 B1).

Regarding Claim 4:

Martins discloses all the claimed elements as listed above.

Martins does not specifically disclose the step of detecting the spatial grid to perform a high-pass filtering operation on the portion of the image such that at least one card of discontinuity pixels is supplied and to detect a first and second type of block artifact from at least one cards of discontinuity pixels.

Nio teaches the step of detecting the spatial grid is intended to perform a high-pass filtering operation (110) on the portion of the image ("FIG. 12 is a block diagram showing the structure of a block noise eliminating apparatus according to a fourth embodiment of the present invention. In FIG. 12, a block noise eliminating apparatus 40 of the fourth embodiment is structured by a horizontal block boundary detecting part 41, a vertical block boundary detecting part 42, a block

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area detecting part 43, a block boundary smoothing part 44, and a picture enhancing part 45." at column 24, line 20), such that at least one card of discontinuity pixels is supplied (Refer to Figure 12, numeral 41-"Horizontal Block" or numeral 42-"Vertical Block"), and to detect a first type (p1) of block artifact and a second type (p2) of block artifact from the at least one card of discontinuity pixels (Further referring to Figure 12, numeral 44-"Block Boundary Smoothing Part" detects the first and second types of blocking artifacts. The examples of the first type of blocking artifacts would be adjacent to numeral 418 (at Figure 13) -"Horizontal Block Boundary" and similarly adjacent to numeral 428 (at figure 14)-"Vertical Block Boundary").

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to add together the step of performing a high pass filtering operation on the portion of the image to detect blocking artifacts from at least one card of discontinuity pixels as taught by Nio to the method of processing a sequence of digital images intended to detect a current, reference and preceding reference grid with at least one block artifact as disclosed by Martins because "by identifying such high-frequency components (horizontal and vertical components as taught by Nio at Fig 13 and Fig 14), we can effectively reduce the blocky noise with techniques such as (high pass filtering)" and "in this manner, processing [of] and taking the frame (grid) difference can be enhanced, image quality improved and data is reduced in volume." (Hadhoud et al., page 301, paragraph 3 and Nio-column 5, line 63, respectively.)

Regarding Claim 5: Nio teaches a step (300) of correcting the blocking artifacts which are present in the current reference grid (RG (t)) in accordance with their type (p1, p2) ("As a result, smoothing or picture enhancement can be properly done corresponding to the block noise level (With reference to Figure 14 and Figure 15), and accordingly, the block noise can be eliminated

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more effectively for the best match to visual scenes. Further, by OSD displaying information, video sources or effects of block noise elimination can be acknowledged at a glance.” at column 29, line 18).

Regarding Claim 7: Nio teaches a television receiver (For example at Figure 1, numeral 101) comprising a processing device using the data processing method as claimed in claim 5, intended to detect a reference grid (RG) within a sequence of digital images and to correct the blocking artifacts’ which are present in said grid with a view to displaying corrected digital images on a screen of said receiver (“As is described in the foregoing, in a video processing device (a television receiver, for example) using digital video signals subjected to lossy encoding on a predetermined image block basis, the present invention can be applied, first, to correctly detect and eliminate block noise to be arisen when the video signal is decoded, and second, to correctly regenerate a dot clock.” at column 31, line 39).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Hadhoud et al. "Improved Method for Blocking Artifact Reduction in Block Coded Images in Wavelet-Transform Domain." 19th National Radio Science Conference, Alexandria, March 19-21, 2002, pages 301-308.
- Chae et al. "Blocking Artifact Reduction in JPEG Coded Images" Image Processing 1999, ICIP 99 Proceedings International Conference, Kobe Japan. Volume 2, 24 October 1999, pages 894-898.
- Minami et al. "An Optimization Approach for Removing Blocking Effects in Transform Coding" IEEE Transactions on Circuits and Systems for Video Technology, Vol 5, No. 2 April 1995. pages 74-82.
- Zhongjie et al. "New Approach to Reducing Blocking Effects in Stereo Video Coding" Signal Processing, 2002 6th International Conference Volume 2, 26-30 August 2002. pages 1027-1030.

US 6,950,605 B1

US 5,579,121 A

US 6,859,558 B2

US 7,027,661 B2

US 6,427,031 B1

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is 571-270-1583. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkrum Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Mia M Thomas
Examiner
Art Unit 2624

Mia M. Thomas



VIKKRAM BALI
PRIMARY EXAMINER